

PROCEDURE FOR DRAWING AND USING GEOGRAPHICAL
OR BLOCK SAMPLE IN CONNECTION WITH FIELD APPRAISALS

1. General Description and Application of Geographical or Block Sample.

Geographical sampling is a standard sampling method which is well suited in many areas for the purpose of sampling for completion of farm KWH consumption schedules. This method of sampling has given satisfactory results in two field appraisals in Kansas and one in Iowa. It can probably be adapted to local conditions and used successfully throughout most of the Great Plain area. Undoubtedly it can also be used in other areas provided the method is well understood and the limitations are recognized.

Like the farm sampling method outlined in the Field Appraisal Manual, geographical samples are random samples; i.e., the respondents are selected by a chance drawing in such a manner that each person in the area being sampled has an equal chance of being included in the sample. Unlike the sampling method outlined in the Field Appraisal Manual, the geographical sample is not drawn from a list of names on tabulation sheets or AAA listing sheets, instead, the sample is drawn from a map of the cooperative's system area and is a sample comprised of blocks of land. If the map used for drawing the sample has sections of land indicated on it, the sample includes the sections drawn by chance. If the map does not have the sections or other suitable grids on it, a grid can be drawn on the map to provide blocks of land of the desired size. The three examples included herein indicate possible methods of drawing the sample.

Because the sample consists of blocks of land, those who have used the geographical method in connection with field appraisals have termed the sample a "block sample".

Every farmstead located in the blocks of land drawn in a block sample is visited for completion of a KWH consumption schedule. Occasionally a block drawn in the sample may have no farmsteads, in such a case there will be no KWH schedules obtained for that block. Substitute respondents will be interviewed only in case the respondent refuses to give the information or in case the respondent is not home and the appraiser will not be in the area again. If it is necessary to take a substitute, the substitute will be the farmstead outside the sample block nearest that of the original respondent, irrespective of class and status. No substitutes will be taken for abandoned farmsteads, farmsteads temporarily unoccupied, respondents who will not use electricity, or respondents whose farming enterprises are not representative of the area; in such instances the schedule prepared for the respondent will have a notation in the "Remarks" Section indicating why the schedule was not completed and the code number 8 will be entered opposite "Type of Schedule" in the schedule heading.

2. Advantages of the Block Sample.

The block sample is considerably easier to draw than a sample which must be drawn from tabulation sheets and/or AAA listing sheets. Its representative is not dependent on the accuracy and completeness of any list of names, since all farmsteads in the blocks drawn are insured for completion of KWH consumption schedules. If properly drawn, the block sample automatically provides good geographical distribution of the sample, which is a factor of considerable importance in securing a representative sample; samples drawn from lists of names are sometimes dependent on chance for geographical distribution and therefore may not be well distributed over the area. The use of the block sample usually reduces the travel expense and the time required in the field, since the sample tends to group the farmsteads to be visited into small groups; the extent of this advantage depends largely on the size of the block used. In most areas, the block sample can be expected to produce results equally as reliable as a sample of comparable size drawn by any other means, provided the size of the block of land which is the unit of the sample is carefully determined in light of the size of the system area being sampled, the size of the sample desired, the number of factors which will affect KWH consumption in the area, and the variability of the area in respect of topography, soils, farm incomes, type of farming, settlement, size of farms, ownership characteristics and other factors which affect farm KWH consumption.

3. Limitations in the use of Block Samples.

From a practical standpoint some areas are not suitable for block sampling. Careful selection of the correct size of the block applicable in the area will generally result in a representative sample, but in some cases the size may be so small as to eliminate any advantages of the block sample. If the area was small, for example 10 miles square, it would be necessary to use a very small block in order to get good geographical distribution over the entire area. Another case in which the block sample is not suitable is an area containing a small but important irrigated acreage, surrounded by a large area of dry range land; a block of suitable size to properly sample the irrigated acreage would be too small for use on the range land. These two examples serve only to illustrate the point and by no means include all the instances in which block samples are not suitable.

In areas where there is considerable variation in respect of the factors affecting farm KWH consumption, the size of the block might necessarily be very small in order to be certain of getting a proper proportion of all the characteristics of the system area. In such case, the advantage of the block sample in time and travel savings in the field may be negligible. However the block sample may still be preferable because of the ease of obtaining a good sample, particularly if the use of other methods involves the use of several sets of old tabulation sheets.

No specific rules applicable in all cases can be given for determination of the size of the block. The size must be determined by the appraiser after a careful evaluation of the area and consideration of the variability of the factors in the area affecting KWH consumption. If the area under consideration is suitable for block sampling, a section of land (640 acres) will generally be a satisfactory block sampling unit; if a smaller unit is needed, the advisability of using a block sample is questionable. The size of the block should rarely exceed three sections. It should be remembered that from the standpoint of representativeness of the sample, it is better to err on the side of choosing a sample block smaller than necessary than to choose one too large.

The results obtained from a block sample can not always be used in the same manner as the results obtained from a sample drawn from the tabulation sheets. It cannot always be broken down for analysis of its component parts. For example, a sample drawn from tabulation sheets includes a minimum of 30 potential respondents, which provides a sufficient number of observations for analysis of the potential farm consumers in the area. The block sample drawn for this same area would contain potentials in approximately the same proportion as in the entire area from which the sample was drawn. A block sample drawn to include 5 percent of 1500 prospective farm consumers in the area (of which 1400 are signed and 100 are potentials) would have approximately 70 signed and 5 potential respondents. The 5 potential respondents are not a sufficient number of observations for an analysis of the 100 potential farm consumers. On the other hand, the block sample does provide an adequate basis for analyzing the entire area from which it was drawn without the necessity of applying appropriate weights to the signed and potential farms as must be done in the case of samples drawn from tabulation sheets.

Since the respondents of a block sample become a part of the sample because their farmsteads lay in blocks of land drawn in the sample, the appraiser has no way of identifying the respondent in relationship to the cooperative except to check his completed schedules against the maps and tabulation sheets, or against the records of the cooperative to obtain the detail map number, the farm number, and the system letter designation of the allocation of which the farm is a part.

4. Steps in Block Sample Drawing and Examples of Block Sample Drawing.

- (a) The appraiser must first reach a decision as to the suitability of a block sample for the area under consideration.
- (b) If a block sample is to be used, the next consideration is the map to be used. A key map of the system area with sections or other suitable grids is ideal for block sampling. If such a map is not available, state highway maps with suitable grids are sometimes available. If no suitable gridded maps are available, the appraiser can prepare a satisfactory map by putting grid lines on an ungridded map which indicates the location of farmsteads.

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- (c) The appraiser must/decide on the size of the block. He will have most of the facts necessary for this decision from his consideration of the suitability of a block sample (step (a) above).
- (d) The appraiser is now prepared to draw the block sample. The three examples explained below indicate possible methods which may be used. These examples are intended only to illustrate typical situations the appraiser will encounter in the application of block sampling methods. The appraiser should plan the block sampling procedure he will use in each appraisal, taking into consideration all the problems involved, and should include all data and facts on the drawing in his report on the sample drawing.

Example 1. A 5 percent block sample using a block size of one section (640 acres) is desired. A map of the system area with section lines is available. The appraiser selects as an arbitrary starting point the section in the extreme northwest corner of the area. The appraiser draws a number, which is number 8. He then counts 8 sections (beginning at the section in the northwest corner of the area selected as an arbitrary starting point) to the right of the arbitrary starting point. The 8th section, the 28th, the 48th, and every twentieth section thereafter throughout the entire area would comprise the sample. In counting, the appraiser begins with the 8th section and counts from left to right until he reaches the extreme right edge of the area; he then drops to the next row of sections below and counts from right to left until he reaches the extreme left edge of the area, and he continues the process until the entire area has been counted.

The procedure indicated above is one of the simplest methods of drawing a block sample, and is probably best suited of the possible methods for most areas.

Example 2. A 10 percent block sample using a block of two sections (1280 acres) is desired. The appraiser proceeds exactly as described in Example 1 above; assuming he drew the number 8 he would begin counting at the 8th section, and the 28th, the 48th, and every twentieth section thereafter would become the "pivot" sections. These pivot sections constitute half of each block in the sample; the remaining section in each block is an adjacent section. The position of the second section in the block above the pivot section could be arbitrarily established before commencing sampling or it could be determined by a drawing. For example, the appraiser could draw one of four numbers for each pivot section; number 1 could represent the section to the left of the pivot section, number 2 could represent the section above the pivot section; number 3 could represent the section to the

right of the pivot section, and number 4 could represent the section below the pivot section. In the case of pivot sections on the edge of the system area, the drawing would result in some of the non-pivot sections falling outside the system area; in such cases the number should be drawn again to obtain a non-pivot section inside the system area.

The procedure explained above is also applicable when the block is more than 2 sections, except that there are more possible combinations of positions about the pivot section.

Example 3. A sample of about 8 percent using a block of three sections (1920 acres) is desired. The appraiser decides to use a map which has townships of 36 sections each shown on it. Using 36 numbers for drawing, he first establishes a pivot section in each township. He then draws to determine the position of the two non-pivot sections in the block about each of the pivot sections in the manner described for Example 2. There are 6 possible arrangements of the two non-pivot sections about the pivot section if the two non-pivot sections are drawn from the four sections adjoining the pivot section. The non-pivot sections may fall outside the township provided they are inside the system area; if they fall outside the system area it is necessary to draw again until an arrangement entirely inside the system area is obtained.

The principle of the procedure indicated above could be applied in any area irrespective of whether townships were indicated. The area could be divided into sub-areas of any size desired; for example, sub-areas containing 100 sections could be laid off and the sampling procedure indicated above could be applied in the same manner.

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